

**TECHNICAL REVIEW DOCUMENT
FOR
RENEWAL OF OPERATING PERMIT 99OPMR210**
to be issued to:

Cargill Meat Solutions Corporation
Morgan County
Source ID 0870024

Prepared March 2006 – January 2008
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I. Purpose

This document will establish the basis for decisions made regarding the Applicable Requirements, Emission Factors, Monitoring Plan and Compliance Status of Emission Units covered by the renewal Operating Permit proposed for this site. The original operating permit was issued to the Excel Corporation on January 1, 2002 and expires on January 1, 2007. This document is designed for reference during review of the proposed permit by the EPA, the public, and other interested parties. The conclusions made in this report are based on information provided in the renewal application submitted December 30, 2005. Please note that copies of the Technical Review Document for the original permit and any Technical Review Documents associated with subsequent modifications of the original Operating Permit may be found in the Division files as well as on the Division website at <http://www.cdphe.state.co.us/ap/Titlev.html>. This narrative is intended only as an adjunct for the reviewer and has no legal standing.

II. Source Description

This source is a beef slaughter, processing, and packaging facility located at 1505 East Burlington Avenue, Fort Morgan, Morgan County. Equipment at the facility includes a blood dryer, bone dryer, boilers, and an anaerobic wastewater treatment plant. All digester gas (biogas) generated in the treatment plant is rerouted for combustion in steam generating units. A flare combusts digester gas when the steam generators are unable to accept all biogas generated. There are no affected states within 50 miles of the facility. There are no Federal Class I designated areas within 100 kilometers of the facility.

The Title V application reports the facility is subject to the Accidental Release Plan provisions of 112(r)(7) of the Clean Air Act.

Facility wide emissions are as follows (tons/year):

<u>Pollutant</u>	<u>Actual</u>	<u>Potential*</u>
Particulate Matter	25	50.4
PM ₁₀	25	39.7
Nitrogen Oxides (NO _x)	79	96.7
Sulfur Dioxide (SO ₂)	8	12.1
Carbon Monoxide	81	122.0

*Potential emissions are based on permitted levels.

Prevention of Significant Deterioration

This plant is located in an area designated as attainment for all criteria pollutants. Under an April, 1999 Consent Agreement, a Prevention of Significant Deterioration (PSD) permit was issued for sulfur dioxide emissions, therefore the facility is required to obtain an operating permit. See discussion under Section II regarding current PSD status.

II. Discussion of Modifications Made

Source Requested Modifications

The permittee requested the following revisions to the Operating Permit in their renewal application.

Information Page

Update Facility Contact information.

Section I

Condition 5.1 corrected to indicate one of the Cleaver Brooks boilers burns biogas. (Previous permit allowed biogas combustion in this boiler, however requirements for this boiler were combined with the other Cleaver Brooks boiler. The biogas Cleaver Brooks boiler is now combined with the other boilers that burn biogas.) The Tray Former Room is added to the equipment list.

Condition 6 is added to indicate which units are subject to CAM requirements. The SO₂ emission limit for biogas combustion in the boilers is subject to CAM because control equipment is used to meet the limit, and uncontrolled emissions are greater than 100 tons/year. The Division has determined that the cyclone/mechanical separators used at the bone and blood dryers are not control equipment, but are an integral part of the equipment, since the separated material is included as product.

Section II

Conditions 1 – 3:

The permittee requests an increase in the amount of permitted biogas combustion in the boilers, and an increase in the annual hours of operation. In addition, the current permit allows combustion of biogas in three boilers, and sets forth a combined emission limit for two of the boilers, and a separate emission limit for the third boiler. The permittee requests a single combined total emission limit that applies to all three boilers. Cargill has also requested use of distillate fuel oil as fuel to be combined with the tallow for combustion. Finally, application is made to use groundwater when drought conditions exist, and Fort Morgan low sulfate city water is not available. Up to 30% groundwater may be used.

The Division has added gas, tallow, distillate fuel oil and flare emission factors to the appropriate tables. The Division has also included flare emission limits in Table 1. An equation to convert the gas emission factor for fuel gas of less than 1020 Btu/scf has been added to the permit. The biogas heat content can vary between 700-750 Btu/scf according to Cargill. The Division has included a requirement (Condition 1.12) to test and determine the biogas heat content on a semi-annual basis (twice per year).

In 1998, the Division determined that Cargill (then Excel) was a major source of sulfur dioxide emissions (SO_2), and therefore subject to the Prevention of Deterioration (PSD) requirements. At that time, the Division determined the potential SO_2 emissions were 363.7 tons/year (TPY).

The Division revised condition 1.1 & 1.9.9 to allow for an annual flow meter calibration as requested by Cargill.

Condition 1.7 was revised to require a check for pilot flame only, since the flare does not operate at all times. In addition, the weekly opacity check has been removed since the flaring events occur intermittently and a routine observation is not appropriate.

Condition 1.9.7 was modified to remove the “worker safety evaluations” requirement as requested by Cargill. Cargill has a separate worker safety program in place and it should not be a requirement of this air permit.

Condition 1.10 was written to clarify that the 30% groundwater use is per calendar month.

Condition 10 was modified to add the fuel oil boiler requirements.

Excel submitted a PSD application, and the Division determined that BACT was 98% control of the potential emissions from the lagoon system. The BACT determination indicated that the emission limit could be met as follows:

A sulfur recovery system...such that recovery of sulfur shall be a minimum of 98%.

Alternatively, the permittee may use low sulfate water...so as to limit sulfur dioxide emissions to 7.15 tons/year. Supplemental controls may be used (if use of low sulfate water alone does not limit the emissions to the rate specified) to limit the total sulfur dioxide emissions to 7.15 tons/year.

This requirement was included in the originally issued operating permit. It appears the 7.15 TPY SO₂ limit was determined by applying the 98% control requirement to the potential emissions, thus the effect of either alternative is to limit the potential emissions by 98%. To date, Cargill has used a combination of control equipment and low sulfate water to meet the emission limit.

During the term of the originally issued operating permit, the permittee applied to combust biogas in one of the Cleaver Brooks boilers. This modification was made to the permit.

After application of the BACT limit, the facility was no longer a major source of SO₂ emissions. Therefore, the facility can increase SO₂ emissions above the PSD significant level without triggering new PSD analyses, however, the existing BACT requirement must remain in place. In this renewal operating permit application, Cargill requests to increase the amount of biogas burned in their boilers, and also to use groundwater in the system during periods of drought when low sulfate water is not available. In order to allow for these requests and maintain the existing BACT requirement, the Division proposes to revise the BACT emission limit as follows.

Sulfate content of water supply used to estimate potential emissions in 1998: 1355 lb S/mmscf (To maintain the integrity of the original BACT determination, the Division proposes to use this sulfate content to recalculate the facility's potential emissions. Lower sulfate water is now available, however, the sulfate content of this "now available" water supply is higher than the sulfate content of the low sulfate water assumed in the original PSD application. Use of the lower sulfate content would require a complete re-visitation of the existing BACT determination and PSD analyses. Since no physical change is being made to the lagoon system, the Division believes the use of the old sulfate content is a reasonable method for recalculating the potential emissions.)

$$1355 \text{ lb S/mmscf} \times 64 \text{ lb SO}_2/32 \text{ lb S} \times \text{scf}/750 \text{ BTU} = 3.613 \times 10^{-6} \text{ lb SO}_2/\text{BTU}$$

Sulfate content of the new groundwater supply: 1945 lb S/mmscf.

$$1945 \text{ lb S/mmscf} \times 64 \text{ lb SO}_2/32 \text{ lb S} \times \text{scf}/750 \text{ BTU} = 5.187 \times 10^{-6} \text{ lb SO}_2/\text{BTU}$$

Use of groundwater is limited to 30%.

Use of biogas increases to 297,000 mmBtu/year (from approximately 201,310 mmBtu/year)

Revised “1998” facility potential emissions based on increased biogas use and addition of groundwater use:

$$\{[297,000 \times 10^6 \text{ BTU/year} \times .70 \text{ (percent use)} \times 3.613 \times 10^{-6} \text{ lb SO}_2/\text{BTU}] +$$
$$[297,000 \times 10^6 \text{ BTU/year} \times .30 \text{ (percent groundwater use)} \times 5.187 \times 10^{-6} \text{ lb}$$
$$\text{SO}_2/\text{BTU}]\} \times \text{tons SO}_2/2000 \text{ lb SO}_2 = 606.65 \text{ TPY SO}_2$$

Revised BACT emission limit:

$$(606.65 \text{ TPY}) (1-.98) = 12.14 \text{ TPY}$$

Using this approach, the 98% control calculation underlying the emission limit remains in place, and Cargill is still required to meet the limit using low sulfate water, control equipment, or a combination thereof. Cargill has chosen to use the alternative low sulfate water/control equipment combination BACT option, therefore the 98% control requirement is not included in the permit. (This requirement was previously removed from the current permit.)

In order to accommodate this request, Condition 1 of Section II is revised to include provisions for one of the Cleaver Brooks 25 mmBtu/hour boiler that was previously permitted under Condition 3. The biogas fuel use limits and associated emission limits are increased as requested.

In their renewal application, the permittee requests separate fuel use and emission limits for each boiler, for combustion of natural gas and biogas. Since the facility does not emit major amounts of any pollutant, and is not a synthetic minor source, the rolling twelve month total requirements are removed from the permit, and emission limits are based on an annual period.

The renewal application requests an increase in tallow combustion for all boilers that currently combust tallow.

Condition 1.2 is revised to increase the H₂S emission limit based on increased biogas treatment. The Division applies a 98% control factor instead of 98.5% to estimate H₂S emissions of 0.53 ton/year. To estimate emissions, the monthly controlled sampled H₂S content will be used and the uncontrolled emissions will be estimated assuming 98% control efficiency.

Condition 1.11 sets forth the compliance assurance monitoring requirements.

Monitoring provisions for the SO₂ emission limit were previously included in Appendix G of the permit. The monitoring provisions are moved to Condition 1.2 & 1.9 of the permit. The application sets forth three scenarios for monitoring H₂S content of the biogas. Since the Division expects the scrubber may need to be used to meet the revised BACT limit regardless of type of water used, the permit requires monthly chromatograph sampling of biogas for compliance purposes and weekly gas tube sampling regardless of water used, to determine when the scrubbers should be regenerated. The Division also clarified that “average biogas flow rates during the previous month” means a biogas flow rate greater than 80% of the average flow rate from the previous month. The Division will also allow an average of up to two readings during the month. The readings must be taken at least 7 days apart. If more than 2 readings are taken in a month, the 2 highest readings (that are at least 7 days apart), must be used for the average. The pressure drop readings in Condition 1.9.6 have been removed since pressure drop is not an indication of scrubber performance.

Condition 4.3.B was clarified to identify that *at least* 6 inches of water must be maintained.

Condition 6.5 was clarified that temperature must be maintained *when material is in the dryer*.

Conditions 5 and 6: The renewal application requests an increase in natural gas use up to maximum heat input design rate of the bone meal dryer and the rotary blood dryer. Reference to the cyclone/mechanical separators as control equipment for these dryers is removed from Section I, Condition 5. The separators are an integral part of the equipment.

Emissions increases due to the request in increased fuel use for Conditions 1-6 are as follows (TPY):

Pollutant	PM	PM10	NOx	SO2	VOC	CO
Current PTE*	52.0	41.3	96.7	13.6	5.5	122.0
Previous Permit Limit	42.9	40.5	83.2	14.2	0	88.1
Change	9.1	0.8	13.5	-0.5	5.5	33.9

*Based on worst-case fuel use emissions. Includes emissions below APEN reporting thresholds. Emissions less than 2 tons/year actual uncontrolled are not included as permit conditions, in accordance with Division policy.

Since the emissions increases are less than the modeling significance levels, no ambient impact modeling is required. (There were previously no short term emission or design rate limits, therefore no increase in short term emissions will occur.)

New Condition 7 is inserted to include requirements for the tray former room. Since actual uncontrolled emissions are greater than de minimis levels, the applicable requirements included in the renewal permit are glue consumption and a VOC emission limit. VOC emissions are based on mass balance, using the VOC content of the glue. No opacity emissions are expected from this activity.

Condition 9.3 was clarified that this applies to *cold* startups using tallow.

Appendix A

The insignificant activity list is updated.

Appendix G

Appendix G sets forth the Compliance Assurance Monitoring (CAM) Plan to ensure the iron sponges are operating properly to control H₂S emissions and ensure compliance with the boiler biogas SO₂ emission limit. The application proposes H₂S content and biogas flow rate as scrubber operating indicators. The Division has determined that biogas flow rate is not an indicator for determining if the scrubber is operating properly. After multiple discussions with Cargill, the Division has included a daily inspection requirement of the Mtarri scrubber system. This inspection will check for equipment leaks, and proper temperature and moisture in the tanks.

The application selects an H₂S content threshold of 15,000 ppmv. This value would indicate the H₂S content of the uncontrolled biogas related to the emissions limit, not the controlled biogas. The Division has calculated that the H₂S content of the treated biogas related to the emission limit would be 369 ppmv.

$$(12.14 \text{ tons SO}_2/\text{year}) \times (\text{year}/297,000 \times 10^6 \text{ BTU}) \times (2000 \text{ lb SO}_2/\text{ton SO}_2) \times (750 \text{ BTU}/\text{scf gas}) \times (32 \text{ lb S}/\text{lb SO}_2) \times (34 \text{ lb H}_2\text{S}/32 \text{ lb S}) \times (\text{lbmol H}_2\text{S}/34 \text{ lb H}_2\text{S}) \times (385.3 \text{ scf H}_2\text{S}/\text{lbmol H}_2\text{S}) = 369 \text{ scf H}_2\text{S}/10^6 \text{ scf gas (369 ppmv)}$$

Other Modifications

The following revisions are made to the permit consistent with recently issued permits, to include comments made by the EPA on other Operating Permits, to reflect updated and current Regulatory language, as well as to correct errors or omissions identified during review of the modification.

Boiler B –5 was assigned Emission Unit Number S010.

Information Page

Add note regarding when reports are due.

Section I

Condition 1.5 – Revised to change “Condition 21” to “Condition 22” to reflect newest version of Section IV, General Conditions.

Conditions 3.1 and 4.1 – Revised to reflect current Division permit language.

Section II

Condition 8.3 – Opacity credible evidence monitoring language is revised to reflect current Division language.

Section III

Regulatory citation is updated.

Condition 1 – Language is updated to reflect current Division language.

Section IV

Revised to incorporate most recent General Conditions, to reflect new Regulation No. 3 formatting.

Appendices B and C

Incorporate Division’s latest versions.

Appendix D

Update EPA addresses.